EVALUATION OF AFLATOXINS AND STORAGE FUNGI IN SESAME, CHICKPEA AND FABA BEAN EXPORT COMMODITIES FROM GONDAR TOWN, NORTH WEST ETHIOPIA.

Original Research Article

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ABSTRACT

Aflatoxins are highly toxic, mutagenic, teratogenic and carcinogenic kind of mycotoxin. Consumption of aflatoxin contaminated commodities poses serious hazard to the health of human and animals. This study aimed to determine the Aflatoxin level and storage fungi quality of export commodities of sesame, chickpeas and faba beans from Gondar town. The post harvest grain samples were collected randomly from different cleaning warehouses and 60 samples were taken for analysis. By taking 25gm composite sample from each collected samples followed by washing and surface sterilization serial dilution were done and the dilution were poured on PDA plates for isolation and identification of storage fungi. The prevalence of fungi were high in chickpeas and faba beans (60%) followed by sesame. *Aspergillus niger* (30%, 35% and 40%) and *Aspergillus fumigatus* (25%, 40% and 45%) were the most frequently isolates followed by *Aspergillus flavus* (15%, 35% and 25%) from sesame chickpea and faba bean samples. Aflatoxin B_1 was detected in 11 samples representing 10.33% and aflatoxin B_2 was detected in 1 sample. The highest incidence of aflatoxin contamination occurred in Chickpea (25%) followed by sesame and faba bean (15% each) while no aflatoxin G_1 and G_2 contamination was detected in all samples. Therefore, low level of storage fungi contamination and AFs occurs frequently in sesame, chickpea and faba bean and can be improved using proper harvesting practices, storage and transportation conditions. The small quantities of AFs warrant performing further investigation, monitoring and routine analysis on regular basis.

KEYWORDS :

Aflatoxins, storage fungi, TLC, sesame, faba bean and chickpea

I. INTRODUCTION

Storage Fungi invade cereal and grains during storage. Storage fungi cause two distinct problems in storage grains: Grain spoilage from fungal growth or molds and the production of poisonous mycotoxins. While the losses from spoilage may be of greater economic significance, they are less dangerous than the presence of mycotoxins (Flavio Dias Ferreira *et al.,* 2013).

Aflatoxins have severely impacted food safety and quality in various countries in Africa, Asia, and South America. Major agricultural commodities most susceptible to Aspergillus fungus are groundnuts, maize, oilseeds, spices, cottonseed and various tree nuts. Humans and animals can be affected acutely and chronically when they ingest foods contaminated by aflatoxins. It is also possible for animals that eat contaminated feed to produce meat, eggs, and milk that are also contaminated. Crops can become contaminated with the fungus that produces aflatoxin both before and after harvest. Prior to harvest a crop can become contaminated because of stress caused by high temperatures, damage from insects, and dry conditions. Once the crop has matured the likelihood of aflatoxin contamination increases, when it is exposed to rain or high humidity levels, improperly dried and stored, or transported. Regulation of the acceptable levels of aflatoxins and other mycotoxins in food to be consumed by people and animals varies from country-to-country (USDA, 2011).

One of the largest and most recent occurrences of severe aflatoxin poisoning was in Kenya in 2004. Individuals from over seven districts ate locally produced maize that was contaminated with extremely high levels of aflatoxin. As a result, 125 people died and 317 people became ill. Smaller outbreaks were also reported in Kenya in 2005 and 2006 (USDA, 2011). Between 2004 and 2006, nearly 200 Kenyans died after consuming maize contaminated with high levels of aflatoxins and in 2010 over 2 million bags of maize in the Eastern and Central provinces were found to be highly contaminated and were not tradeable. Women, children and the poor are the most vulnerable to prolonged exposure. Research conducted by Leeds University and the International Institute of Tropical Agriculture (IITA) found that 99 per cent of children at weaning age in Benin and Togo are exposed to health risks linked to aflatoxin (IITA ,2013).

Aflatoxins also have an impact international trade. Globally, about US$1.2 billion in commerce is lost annually due to aflatoxin contamination, with African economies losing US$450 million each year due to lost trade. Aflatoxins are also non-tariff barriers to international trade since agricultural products that have more than the permissible levels of contamination (four parts per billion in the EU) are banned. Exported goods have to comply with the food safety and quality requirements of importing countries, and quality plays an important role in increasing trade volumes and assuring the competitiveness of African food products. With agricultural development a global priority, local procurement and robust market access efforts are being scaled up in sub-Saharan Africa. However, food quality and safety issues resulting from aflatoxin contamination have presented a significant obstacle to programmes designed to improve nutrition and agricultural production while linking small farmers to markets (IITA ,2013). Unfortunately, to date no systematic survey is available on the occurrence of AFs particularly in Ethiopia. However, few comparative studies on peanut and maize are reported.

There are a number of export companies which uses raw sesame, chickpea and faba bean as a major export commodity to earn currency. Analyzing the quality and aflatoxin level of raw sesame, chickpea and faba bean of export commodity in Gondar is an important to identify the risk of Aflatoxins. This study will provide the information that can be used as to minimize the effect of Aflatoxins and to monitor the quality of raw sesame, chickpea and faba bean export commodity. It is also contribute to solve the risk and economic effect of Aflatoxins associated with health and international trade (Rudolf Krska *et al.,* 2008).

The goal of this work is to protect agricultural environment, estimate quality of commercials of agro-products, and safeguard safety of consumers' health and lives, and analytical methods for determination of aflatoxin, play a great role for monitoring and estimation of the contaminants. The objective of this study is to determine the aflatoxin level and the mycological quality of export commodities of sesame, chickpea and faba bean in Gondar town.

II. MATERIALS AND METHODS

Study area and design

Geographically Gondar is located at 12°36' North and 37°28' East longitude and it has altitude i.e. 2133m above sea level. The range of average monthly temperature is 10-29°C. The mean relative humidity for an average is recorded as 55.7% and on a monthly basis it ranges from 40%in January and February to 79% in July (CSA, 2012). The study was conducted at University of Gondar Department of Biology microbiology laboratory.

The study design was cross sectional and conducted as by using experimental based type. The grain samples were regularly collected and analyzed for isolation and identification of aflatoxin producing and storage fungi and to determine the type and level of aflatoxin following standard procedure.

Sample collection, Isolation and identification of fungi

The post-harvest samples of sesame, chickpea and faba bean were collected randomly from different cleaning warehouses at Gondar town in 2016. The representative composite samples of one kg were collected randomly and total of 60 samples were taken. The collected samples were placed into sealed plastic bags and brought to Microbiology Laboratory at University of Gondar and stored until analysis.

About 25 gm of the collected lot samples were washed with 250 ml of sterile distilled water for successive times (after thoroughly mixing each sample) and then surface sterilization using 70% ethanol and soaking in 3 % Sodium hypochloride (NaOCl) solution for 1 minute were done, and finally were rinsed with sterile distilled water under aseptic conditions. Then 250 ml of sterile distilled water was added to 25gm of the seeds and aseptically homogenize with ultrathorax. The suspension was diluted to$10^{-2}$and 10^{-3} (James *et al.,* 2012).

Potato dextrose agars (PDA) and Czapek Dox agar (CZA) were prepared with chloramphenicol (500mg/litre) to inhibit bacterial contamination then autoclaved. About 0.1 ml of the dilutions was inoculated (spread) on sterile PDA and CZA plate. The plates were incubated at 27^0c and daily examination for growth and sporulation for a period 7 days were done. After 7 days of incubation, colony forming units (CFUs) per gram of sample were calculated. For each sample, three replicates were maintained. After the incubation period the different fungal colonies were transfer into fresh PDA and CZA plates for morphological analysis with Lactophenol cotton blue (LCB) wet mount. A drop of LCB is placed on a glass slide and a loopful of the fungal colony were taken and placed on the slide. With the help of sterile needles, the fungal mycelia were teased gently and cover slips were placed on the drop of LCB. The slides were observed under microscope.

Determination Of Aflatoxins

Aflatoxins were determined according to standard method of Association of Official Analytical Chemists (AOAC), by thin layer chromatography (Alim-un-Nisa,2013).

All glassware materials such as flasks, beakers, measuring cylinders, micro pippet tips etc. were washed by diluted sulphuric acid (soaked for several hours) and rinsed successive times by distilled water and checked the absence of acid with PH paper (Joerg Stroka and Elke Anklam ,1999). Then, flasks were wrapped tightly in aluminum foil due to that aflatoxins gradually breakdown under UV light (Joerg Stroka and Elke Anklam ,1999; Yousuf, 2010).

Stock standard solutions of AFB_1, AFB_2, AFG_1 and AFG_2 (~10µg/mL) were prepared by diluting liquid aflatoxin mix standard kit (Supelco, USA) in methanol and the exact concentration were measured by spectrophotometer. A working standard solution of AFB_1 (1µg/ mL), AFB_2 (0.3µg/mL), AFG_1 (1µg/mL), and AFG_2 (0.3µg/mL) in methanol, for spiking and quantification purposes, were prepared by diluting appropriate aliquots of stock solutions of toxin. These stock solutions were then stored at 4°C in refrigerator, wrapped in aluminum foil due to that aflatoxins gradually breakdown under UV light.

The concentration of aflatoxin standard solutions was determined by using spectrophotometer (Joerg Stroka and Elke Anklam ,1999; Terenzio *et al.,* 2011). Standard solutions of mycotoxins are measured throughout the production process to determine the true analytical concentration of the particular mycotoxin as outlined in The Association of Official Analytical Chemists (AOAC) 16th Edition, Methods of Analysis. The absorbance at the maximum wavelength is measured and compared to the molar absorptivity:

$$\text{µg/mL of Aflatoxin} = \frac{\text{Absorbance x Molecular Weight x 1000}}{\text{Molar Absorptivity}}$$

By using the above formula and the information on the Table 2. the concentration of aflatoxin were determined.

Table 1. UV absorption maxima in methanol and molar absorptivity.

Aflatoxin	Mol. weight	265nm	360-362nm
AFB1	312	12,400	21,800
AFB2	314	12,100	24,000
AFG1	328	9,600	17,700
AFG2	330	8,200	17,100
AFM1	328	14,150	21,250(357)
AFM2	330	12,100(264)	22,900(357)

Adopted from (David ,1998).

Sample preparation for chromatographic analysis

Each sample were grinded into powder and kept in moisture proof paper bags to keep their water content constant before analysis, about 25 g of each sample were taken extraction with 100 ml methanol: water (70:30, v/v) containing 1% of sodium chloride by mechanical shaker for 30 min. Then the extracts were filtered with Whatman No. 1 filter paper and the filtrates were used for chromatographic analysis using Thin Layer Chromatography (TLC) respectively (Gopalakrishna *and Rajamina,* 2012).

Clean-up

Column chromatography was used to purify the diluted filtrate. Column chromatography was washed by chloroform and diethyl ether. Silica gel for column chromatography was prepared. Column was packed by using hexane and diethyl ether (50:50 V/V) (Narasimhan and Johnpaul, 2010).). About 5ml of the filtrate were diluted in 15ml distilled water and mixed together. The mixture was transferred into the column. The column was washed twice with 10ml of distilled water. By passing 1ml of acetonitrile through the column Aflatoxin were eluted from the column.

TLC Analysis

The Thin-Layer Chromatographic plates 10X10 cm and 20X20 cm (pre-coating the silica gel on glass/aluminum plates) were used. The plates were activated at 80ºC for one hour in a hot-air oven before use. The sample extract and aflatoxin standard were spotted on TLC plates and placed in TLC tank containing chloroform and acetone in the ratio of 88: 12 (v/v) for 30 minutes at room temperature and the TLC plates were observed under UV light (365 nm) for the presence of Aflatoxins by their characteristic fluorescence properties and determined by the fluorescence intensities of Aflatoxin spots of sample were compared visually with those aflatoxin mix standard spots (AFB_1, AFB_2, AFG_1 and AFG_2). The sample spot, which matches one of the standard spots, was selected. Standards were also used to compare the colour and R_f value of unknown sample streak on the plate. The amount of Aflatoxin was estimated. The blue fluorescence corresponding to the authentic aflatoxin B_1 and B_2 indicated the presence of AFB_1 and AFB_2 in the sample. The green fluorescence corresponds to the authentic aflatoxin G_1 and G_2. Confirmatory tests for Aflatoxins were performed using sulphuric acid (50:50 V/V) with distilled water (Alim-un-Nisa, 2013). Concentrations of aflatoxins (ppb): Concentrations of the Aflatoxins in sesame, chickpeas and faba beans grain samples were determined chromatographically and expressed as μgkg^{-1}.Prevalence of aflatoxin contamination (%):were determined as the percentage of samples which contain detectable Aflatoxins (over the total number of samples).

The retention factor (R_f) of each AFs (B_1, B_2, G_1 and G_2) was calculated in accordance with the equation (i).

R_f = distance moved by compound/distance moved by solvent (i)

Furthermore, the concentration of individual AFB_1, AFB_2, AFG_1 or AFG_2 was calculated according to the following equation (ii).

Concentration of AFB_1, AFB_2, AFG_1 or AFG_2 in µg/kg = S × Y × V / X × W (ii)

Where:

S = Volume (µl) of AFB_1, AFB_2, AFG_1 or AFG_2 standard equal to unknown
Y = Concentration (µg/ml) of AFB_1, AFB_2, AFG_1 or AFG_2 standard
V = Volume (µl) of final dilution of sample extract
X = Volume (µl) of sample extract spotted to give fluorescent intensity equal to S
W = Weight (g) of sample contained in final extract.
The concentration of Total AFs (B_1, B_2, G_1 and G_2) was calculated as mentioned in equation (iii).

Total AFs = Concentration of AFB_1 + AFB_2 + AFG_1 + AFG_2 (iii).

Data Analysis

Data were entered to computer by hand, and analyses were carried out using SPSS version 16.0 used to determine the mean test results.

III. RESULT

Physical status of the collected sample

Colour, odour, texture, insect infestation of sesame, chickpea and faba bean were manually graded and presented in Table 2. All types of samples do not have musty odour and insect infestation. But, the good texture of sesame (99%), chickpea (97%) and faba bean (95%) respectively.

Table 2- Quality (physical status) parameters of cereal grains of exported commodities.

parameters	Colour (%)		Odour (%)		Texture (%)		Insect (%)		Seed Moisture
	G	B	G	M	G	B	P	A	Average (%)
Sesame	98	2	100	0	99	1	0	100	8.2
Chickpea	95	5	100	0	97	3	0	100	8.9
Faba bean	94	6	100	0	95	5	0	100	8.6

G- Good B- Bad M- Musty odour P- Present A- Absent

The mean moisture content of sesame, chickpea and faba bean sampled from warehouses during the time sampling was 8.2%, 8.9% and 8.6% ranged from 8.1 to 12.9% respectively.

Mycological investigations

The mycological quality of export commodities of sesame, chickpea and faba bean cereal grains from Gondar town was conducted to determine the internal infection or invasion of the above cereal grains by storage fungi and also to document the types of fungal species associated with cereal grains in the country. The results are presented in the following Table 3 and Table 4 the frequency (prevalence of fungi) and the average of cfu/gm of each fungi species also reported.

Table- 3. Mycological quality associated with sesame, chickpea and faba bean

Genus/spp.	Sesame		Chickpea		Faba bean	
	F (%)	Cfu/gm	F (%)	Cfu/gm	F (%)	Cfu/gm
A.flavus	3(15%)	$2.2x10^3$	7(35%)	$2.3x10^3$	5(25%)	$3.7x10^3$
A.niger	6(30%)	$3.4 x10^3$	7(35%)	$4.8x10^3$	8(40%)	$2.65x10^3$
A.fumigatus	5(25%)	$4.6x10^3$	8(40%)	$5.0x10^3$	9(45%)	$5.2 x10^3$
A.versicolor	4(20%)	$2.0x10^3$	3(15%)	$2.7x10^3$	8(40%)	$2.6 x10^3$
A.terrus	3(15%)	$1.5x10^3$	3(15%)	$2.3x10^3$	3(15%)	$2.6 x10^3$
A.regulosus	2(10%)	$1.0x10^3$	0.00	0.00	0.00	0.00
A.terricola	2(10%)	$1.0x10^3$	0.00	0.00	0.00	0.00
F.solani	0.00	0.00	3(15%)	$2.0x10^3$	6(30%)	$3.4x10^3$
F.oxysporum	2(10%)	$1.7 x10^3$	3(15%)	$3.2x10^3$	4(20%)	$4.0x10^3$
F.moniliformin	2(10%)	$1.0x10^3$	1(5%)	$2.5x10^3$	2(10%)	$3.2x10^3$
F.proliferatum	2(10%)	$1.5x10^3$	0.00	0.00	3(15%)	$2.0x10^3$
F.semitectum	0.00	0.00	4(20%)	$1.8x10^3$	0.00	0.00
F.chlamydosporum	0.00	0.00	2(10%)	$2.5 x10^3$	2(10%)	$2.2x10^3$
P.notatum	2(10%)	$2.0x10^3$	0.00	0.00	0.00	0.00
Mucor spp.	1(5%)	$1.0 x10^3$	0.00	0.00	0.00	0.00
Alternaria spp.	0.00	0.00	0.00	0.00	0.00	0.00

Table- 4. The prevalence of fungi on exported commodities

Sample type	No. of samples	Prevalence of fungi (%)
Sesame	20	9 (45%)
Chickpea	20	12 (60%)
Faba bean	20	12 (60%)
Total	60	34 (56%)

As presented in the above sections, 14 species of fungi belonging to 3 genera of fungi were identified from total of 60 samples. Sesame, chickpea and faba bean cereal grain samples collected from different warehouses in Gondar town and 20 samples of each cereal grain were collected. Mean values of cfu g^{-1} and frequency for each fungus were averaged over the number of positive sample only. Fungi isolated from the sampled cereal grains are presented in Table 4. The mycological investigation of the collected samples revealed *Aspergillus* spp., *Fusarium* spp. and *Penicillium* spp., but *Aspergillus* spp., and *Fusarium* spp., to be the most prevalent genera in all collected samples of sesame, chickpea and faba bean (Table 3) respectively. The other genera of fungi recovered were *Mucor* and *Alternaria* species.

Storage (warehouse) conditions

About 16 warehouses in Gondar town were assessed during sampling. The warehouse conditions are represented in Table 5. Most warehouses were modern, constructed by concrete and well cemented. In some warehouses modern cleaning machines were observed. But, there were a lack of well educated quality controller, fumigation materials which is important for insect control and waste container structures were also observed.

Table -5. The assessment of warehouses storage conditions in Gondar town.

No.	Warehouse conditions	percentage
1	Well cemented	16/16 (100%)
2	Ventilation (windows for	16/16 (100%)
3	Artificial ventilation	1/16 (6.25%)
4	Cleaning machines	8/16 (68.75%)
5	Different stores for cleaned	5/16 (31.25%)
6	Fumigation materials	3/16(18.75%)
7	Waste container structures	4/16 (25.00%)
8	Well educated quality	2/16 (12.5%)

Aflatoxin contamination

The prevalence of aflatoxin contaminations are shown in Table 6. The level of aflatoxin contamination in sesame, chickpea and faba bean are given in Table 7 and 60 samples were collected and analyzed for aflatoxin contamination AFB_1, AFB_2, AFG_1 and AFG_2 by TLC (thin layer chromatography). Out of 60 samples 11 samples (10.33 %) were found to be aflatoxin contaminated and contain AFB_1 with mean ranging from 3.02 to 3.78µgkg^{-1} in all types of samples respectively. The level of aflatoxin was higher in faba bean than sesame and chickpea. The number of aflatoxin contaminated samples was higher in chickpea. Aflatoxin B_2 was detected in 5.0% of the total samples of faba beans only with the mean of 1.80µgkg^{-1}.AFG_1 and AFG_2 contaminations were not detected in all samples. The results are presented in Table 7.

Table 6. Prevalence of aflatoxin contamination on exported commodities

Types of samples	No. of samples	No. of contaminated sample	% of contaminated sample
Sesame Chickpea Faba bean	20 20 20	3 5 3	15% 25% 15 %
Total	60	11	10.33%

Table7. The positive samples (%), mean of aflatoxin concentration

Sample type	aflatoxins	Positive samples (%)	Mean
Sesame	AFB1 AFB2 AFG1 AFG2	3(15%) ND ND ND	3.02 ND ND ND
Chickpea	AFB1 AFB2 AFG1 AFG2	5(25%) ND ND ND	3.78 ND ND ND
Faba bean	AFB1 AFB2 AFG1 AFG2	3(15%) 1(5%) ND ND	3.66 1.80 ND ND

ND- Not detected

IV. DISCUSSION

The mycological quality of exported commodities of some sesame, chickpeas and faba beans of the collected samples, was poor, bearing many species of fungi, 14 species belonging to 3 genera were isolated. *Aspergillus* species and *Fusarium* species were the most prevalent genera in this study. *Aspergillus* species *A. niger* (30%, 35% and 40%) and *A. fumigatus* (25%, 40% and 45%) is the most frequently isolates followed by *A.flavus* (15%, 25% and 25%) from sesame, chickpea and faba bean samples. *F. solani* (30%) was the most frequently occurred in faba bean samples. Most fungi are present on the postharvest and storage type, which develop after harvest if relative humidity is not controlled during storage (Rudolf Krska *et al.,* 2008). Post-harvest contamination by mycotoxigenic fungi usually occurs during storage and transportation and is normally caused by improper drying or re-wetting of the crop from condensation or rain Preharvest fungal contamination generally occurs in the field and associated with drought and high temperature during the grain–fall (FAO, 1989).

The warehouses storage conditions were assessed in this study. Storage structures (warehouses) commonly found in Gondar town is made from concrete and cement. In some warehouses there were no improved aerations but in some stores there were windows on the top of the sides used for air circulation or ventilation. Sesame, chickpea and faba bean in such warehouses are usually stored in polyethylene bags. Some warehouses do not have separated stores for cleaned and unclean cereal grains were observed in this study this may also increase the contamination of sesame, chickpea and faba bean by storage fungi and aflatoxins. According to Dickens and his collegues (Dickens *et al.,* 1973) associated moisture condensation on roofs, improper application of insecticide sprays or leaking hoses and application equipment, conveyance of water from flooded elevator dump pits into warehouse, and storage of cereal grains on concrete floors that are damp or have no vapor barriers with increased *A. flavus* growth. Mostly sesame, chickpea and faba bean are stored in traditional warehouses in rural areas after harvest in Ethiopia. Most cereal gains are purchased from the rural areas and transported and stored in warehouses to prepare for export. According to Bankole and Adebanjo (2003), traditional storage structures used for on farm storage include containers may increase the contamination of agricultural commodities by storage fungi and the occurrence aflatoxins.

In this study, the analyzed cereal grains the percentage of total Aflatoxin contamination is higher in chickpea (25%) samples than in sesame (15%) and in faba bean (15%) samples. This could be due to improper post harvest technology and storage condition. Contamination can occur at any stage of food production from pre-harvest to storage (Wilson and Payne,1994). Factors that affect aflatoxin contamination include the climate of the region, the genotype of the crop planted, soil type, minimum and maximum daily temperatures, and daily net evaporation (Wilson and Payne,1994); (Ono and Sugiura, 1999); (Fandohan and Gnonlonfin, 2005). Aflatoxin contamination is also promoted by stress or damage to the crop due to drought prior to harvest, insect activity, poor timing of harvest, heavy rains at harvest and post-harvest, and inadequate drying of the crop before storage (Hell and Cardwell, 2000); (Hawkins and Windham, 2005). Humidity, temperature, and aeration during drying and storage are also important factors. Aflatoxins in various agricultural products can be contaminated when drying of agricultural commodities is delayed or moisture level exceeds critical values for the mold growth during storage of the crops.

AFB_1 were observed as the common contaminant in the analyzed samples of sesame, chickpea and faba bean with the mean of 3.02µgkg^{-1}, 3.78µgkg^{-1} and 3.66µgkg^{-1}. However, the result from this study showed that AFG_1 and AFG_2 contamination were not detected in the tested samples of sesame, chickpeas and faba beans. The underlying reason is that the optimal temperature for AFs production ranged between 20–35^{o}C. Elevation of temperature up to 40^{o}C or decline up to 10^{o}C could result in reduced AFs production. The high temperature within the optimal range favors the production of aflatoxin B (B_1 and B_2). In contrast, low temperature favors the production of aflatoxin G (G_1 and G_2) (Schroeder and Hein, 1967). The absence of aflatoxin in the collected samples may not suggest that the fungus *A. flavus* did not produce aflatoxin in the seeds. On the other hand it may be possible that the level of aflatoxin produced was too small to be detected (Pepeljnjak and Cvetnic, 1984).

In this study the detected AFT level was found to be lower than the legal limit of EU (4µgkg^{-1}), USFDA (20µgkg^{-1}), China (20µgkg^{-1}) and India (30µgkg^{-1}). This indicated that the majority of Sesame, chickpeas and fababeans samples in this study are safe. But only one sample of faba bean the detected total aflatoxin level (5.4µg/kg) was found above the maximum permissible limit of EU. The maximum permissible level AFT as well as other mycotoxins in food materials has been regulated in many countries. The legal limits may vary from one country to another, depending on the degree of development and economic consideration. The Scientific Commission of the European Community has regulated the maximum allowable level of 4µgkg^{-1} for total AFT (Commission of the European Communities, 2001). The USFDA has set a maximum admissible level of 20µgkg^{-1} for total aflatoxins in all foods for human consumption (Creppy, 2002)).

V. CONCLUSION

Generally, further study has to be made so as to come up with sound conclusion on mycological investigation and occurrence of aflatoxins associated with Export commodities of sesame, chickpeas and faba beans cereal grain from Gondar town. It can be concluded that *A. niger and A. fumigatus* is more prevalent in sesame, chickpeas and faba beans cereal grain followed by *A.flavus*. The current status of the aflatoxins (AFs) level in export commodities of sesame, chickpea and faba bean does not concurrently present a potential risk to the human health. Nevertheless, the detection of small quantities of AFs warrants further investigation, regular monitoring and performing routine analysis, as per food quality control measure. The initial approach to control storage fungi and AFs is to take precaution and proper action such as better harvesting practices, handling, packaging, storage and as well as transportation.

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